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USPT	('gp39' or 'cd40L' or 'cd40 ligand') same (antibod\$)	126	<u>L2</u>
USPT	armitage-richard\$	17	<u>L1</u>

WEST[Generate Collection](#)**Search Results - Record(s) 1 through 10 of 17 returned.**☐ 1. Document ID: US 6106832 A

L1: Entry 1 of 17

File: USPT

Aug 22, 2000

US-PAT-NO: 6106832

DOCUMENT-IDENTIFIER: US 6106832 A

TITLE: Treatment of individuals exhibiting defective CD40L

DATE-ISSUED: August 22, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Spriggs; Melanie K.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow, III; William C.	Federal Way	WA	N/A	N/A
Widmer; Michael B.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 424/134.1; 424/184.1, 424/192.1, 424/195.11, 514/2, 514/8, 514/885

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	RMC	Draw Desc	Image
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☐ 2. Document ID: US 6087329 A

L1: Entry 2 of 17

File: USPT

Jul 11, 2000

US-PAT-NO: 6087329

DOCUMENT-IDENTIFIER: US 6087329 A

TITLE: CD40 ligand polypeptide

DATE-ISSUED: July 11, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow; William C.	Federal Way	WA	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 514/8; 514/2, 514/885, 530/350, 530/351

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	RMC	Draw Desc	Image
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☐ 3. Document ID: US 5981724 A

L1: Entry 3 of 17

File: USPT

Nov 9, 1999

US-PAT-NO: 5981724

DOCUMENT-IDENTIFIER: US 5981724 A

TITLE: DNA encoding CD40 ligand, a cytokine that binds CD40

DATE-ISSUED: November 9, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow; William C.	Federal Way	WA	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A
Srinivasan; Subhashini	Kirkland	WA	N/A	N/A
Gibson; Marylou G.	Carlsbad	CA	N/A	N/A
Morris; Arvia E.	Seattle	WA	N/A	N/A
McGrew; Jeffrey T.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 536/23.5; 435/252.3, 435/320.1, 435/455, 435/471, 435/69.1, 435/69.7, 536/23.1

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 4. Document ID: US 5962406 A

L1: Entry 4 of 17

File: USPT

Oct 5, 1999

US-PAT-NO: 5962406

DOCUMENT-IDENTIFIER: US 5962406 A

TITLE: Recombinant soluble CD40 ligand polypeptide and pharmaceutical composition containing the same

DATE-ISSUED: October 5, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow; William C.	Federal Way	WA	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A
Srinivasan; Subhashini	Kirkland	WA	N/A	N/A
Gibson; Marylou G.	Carlsbad	CA	N/A	N/A
Morris; Arvia E.	Seattle	WA	N/A	N/A
McGrew; Jeffrey T.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 514/8; 514/12, 514/2, 514/885, 530/350, 536/23.1, 536/23.4, 536/23.5

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 5. Document ID: US 5961974 A

L1: Entry 5 of 17

File: USPT

Oct 5, 1999

US-PAT-NO: 5961974

DOCUMENT-IDENTIFIER: US 5961974 A

TITLE: Monoclonal antibodies to CD40 ligand, pharmaceutical composition comprising the same and hybridomas producing the same

DATE-ISSUED: October 5, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow; William C.	Federal Way	WA	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 424/154.1; 424/130.1, 424/141.1, 424/143.1, 424/144.1,
424/153.1, 424/173.1, 435/326, 435/332, 435/334, 435/343, 435/343.1, 435/343.2,
435/346, 435/452, 435/70.21, 530/387.1, 530/387.9, 530/388.1, 530/388.22,
530/388.7, 530/388.73, 530/388.75

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 6. Document ID: US 5925734 A

L1: Entry 6 of 17

File: USPT

Jul 20, 1999

US-PAT-NO: 5925734

DOCUMENT-IDENTIFIER: US 5925734 A

TITLE: Isolated Epstein-Barr virus BZLF2 proteins that bind MHC class II .beta.chains

DATE-ISSUED: July 20, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Alderson; Mark	Bainbridge Island	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Cohen; Jeffrey I.	Silver Spring	MD	N/A	N/A
Comeau; Michael R.	Seattle	WA	N/A	N/A
Farrah; Theresa M.	Seattle	WA	N/A	N/A
Hutt-Fletcher; Lindsey M.	Kansas City	MO	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 530/350; 435/69.3, 530/387.3

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 7. Document ID: US 5801227 A

L1: Entry 7 of 17

File: USPT

Sep 1, 1998

US-PAT-NO: 5801227
DOCUMENT-IDENTIFIER: US 5801227 A

TITLE: Antibodies to CD40

DATE-ISSUED: September 1, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fanslow, III; William C.	Federal Way	WA	98023	N/A
Zappone; JoDee	Lynnwood	WA	98037	N/A
Alderson; Mark	Bainbridge Island	WA	98110	N/A
Armitage; Richard J.	Bainbridge Island	WA	98110	N/A

US-CL-CURRENT: 530/388.73; 435/326, 435/328, 435/332, 435/334, 435/343,
435/343.1, 435/346, 530/387.1, 530/387.3, 530/388.1, 530/388.2, 530/388.22,
530/388.7, 530/389.6

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	RWC	Draw Desc	Image
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☐ 8. Document ID: US 5753203 A

L1: Entry 8 of 17

File: USPT

May 19, 1998

US-PAT-NO: 5753203
DOCUMENT-IDENTIFIER: US 5753203 A

TITLE: CD30 ligand conjugates

DATE-ISSUED: May 19, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goodwin; Raymond G.	Seattle	WA	N/A	N/A
Smith; Craig A.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Gruss; Hans-Juergen	Bainbridge Island	WA	N/A	N/A

US-CL-CURRENT: 424/1.41; 424/1.69, 424/192.1, 424/193.1, 435/69.5, 435/69.7,
514/883, 530/351, 530/402

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	RWC	Draw Desc	Image
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☐ 9. Document ID: US 5726286 A

L1: Entry 9 of 17

File: USPT

Mar 10, 1998

US-PAT-NO: 5726286
DOCUMENT-IDENTIFIER: US 5726286 A

TITLE: Isolated epstein-barr virus BZLF2 proteins that bind MHC class II beta chains

DATE-ISSUED: March 10, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Alderson; Mark	Bainbridge Island	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Cohen; Jeffrey I.	Silver Spring	MD	N/A	N/A
Comeau; Michael R.	Seattle	WA	N/A	N/A
Farrah; Theresa M.	Seattle	WA	N/A	N/A
Hutt-Fletcher; Lindsey M.	Kansas City	MO	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 530/300; 435/69.3, 530/350

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 10. Document ID: US 5716623 A

L1: Entry 10 of 17

File: USPT

Feb 10, 1998

US-PAT-NO: 5716623
DOCUMENT-IDENTIFIER: US 5716623 A

TITLE: Isolated Herpesvirus saimiri proteins that bind MHC Class II molecules

DATE-ISSUED: February 10, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yao; Zhengbin	Seattle	WA	N/A	N/A
Spriggs; Melanie K.	Seattle	WA	N/A	N/A
Alderson; Mark	Bainbridge Island	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A

US-CL-CURRENT: 424/186.1; 424/192.1, 424/229.1, 424/231.1, 435/69.3, 435/69.7,
530/350, 530/826

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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ARMITAGE-RICHARD\$.USPT.	17

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WEST[Generate Collection](#)**Search Results - Record(s) 11 through 17 of 17 returned.**☐ 11. Document ID: US 5677430 A

L1: Entry 11 of 17

File: USPT

Oct 14, 1997

US-PAT-NO: 5677430

DOCUMENT-IDENTIFIER: US 5677430 A

TITLE: Antibodies directed against CD30 ligand

DATE-ISSUED: October 14, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goodwin; Raymond G.	Seattle	WA	N/A	N/A
Smith; Craig A.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Gruss; Hans-Juergen	Bainbridge Island	WA	N/A	N/A

US-CL-CURRENT: 530/388.23; 530/387.9, 530/389.2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 12. Document ID: US 5674492 A

L1: Entry 12 of 17

File: USPT

Oct 7, 1997

US-PAT-NO: 5674492

DOCUMENT-IDENTIFIER: US 5674492 A

TITLE: Method of preventing or treating disease characterized by neoplastic cells expressing CD40

DATE-ISSUED: October 7, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow, III; William C.	Federal Way	WA	N/A	N/A
Longo; Dan L.	Kensington	MD	N/A	N/A
Murphy; William J.	Frederick	MD	N/A	N/A

US-CL-CURRENT: 424/144.1; 424/143.1, 424/153.1, 424/154.1, 424/155.1,
424/172.1, 424/173.1, 424/174.1, 514/2, 514/8

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 13. Document ID: US D382176 S

L1: Entry 13 of 17

File: USPT

Aug 12, 1997

US-PAT-NO: D382176

DOCUMENT-IDENTIFIER: US D382176 S

TITLE: Milk bag holder

DATE-ISSUED: August 12, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Armitage; Richard	Brantford, Ontario	N/A	N/A	CAX

US-CL-CURRENT: D07/602

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 14. Document ID: US 5573924 A

L1: Entry 14 of 17

File: USPT

Nov 12, 1996

US-PAT-NO: 5573924

DOCUMENT-IDENTIFIER: US 5573924 A

TITLE: CD27 ligand

DATE-ISSUED: November 12, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Beckmann; M. Patricia	Poulsbo	WA	N/A	N/A
Goodwin; Raymond G.	Seattle	WA	N/A	N/A
Giri; Judith G.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A

US-CL-CURRENT: 435/69.5; 435/252.3, 435/320.1, 435/365.1, 530/351, 536/23.5,
930/140

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 15. Document ID: US 5565321 A

L1: Entry 15 of 17

File: USPT

Oct 15, 1996

US-PAT-NO: 5565321
DOCUMENT-IDENTIFIER: US 5565321 A

TITLE: Detection of mutations in a CD40 ligand gene

DATE-ISSUED: October 15, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Spriggs; Melanie K.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Fanslow, III; William C.	Federal Way	WA	N/A	N/A

US-CL-CURRENT: 435/6; 435/7.1, 435/91.1, 536/23.1, 536/23.5, 536/24.3,
536/24.31

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 16. Document ID: US 5480981 A

L1: Entry 16 of 17

File: USPT

Jan 2, 1996

US-PAT-NO: 5480981
DOCUMENT-IDENTIFIER: US 5480981 A

TITLE: CD30 ligand

DATE-ISSUED: January 2, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goodwin; Raymond G.	Seattle	WA	N/A	N/A
Smith; Craig A.	Seattle	WA	N/A	N/A
Armitage; Richard J.	Bainbridge Island	WA	N/A	N/A
Gruss; Hans-Juergen	Bainbridge Island	WA	N/A	N/A

US-CL-CURRENT: 536/23.5; 435/252.3, 435/320.1, 435/69.5, 435/69.7, 530/351

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 17. Document ID: US 5223605 A

L1: Entry 17 of 17

File: USPT

Jun 29, 1993

US-PAT-NO: 5223605

DOCUMENT-IDENTIFIER: US 5223605 A

TITLE: Interleukin-4 binding protein-.gamma.

DATE-ISSUED: June 29, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fanslow; William C.	Federal Way	WA	N/A	N/A
Armitage; Richard J.	Seattle	WA	N/A	N/A

US-CL-CURRENT: 530/350; 435/69.1, 435/69.2, 530/351, 530/389.1, 530/395,
530/827, 930/141

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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ARMITAGE-RICHARD-J.USPT.	16
ARMITAGE-RICHARD\$.USPT.	17

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ANTIBOD\$	0
ANTIBOD.USPT.	186
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ANTIBODEY.USPT.	1
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ANTIBOD\$(ANTIBODY/BLEOMYCIN-TARGET).USPT.	pickup term
((GP39' OR 'CD40L' OR 'CD40 LIGAND') SAME (ANTIBOD\$)).USPT.	126

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same (antibod\$)[Clear](#)**Search History**

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? b	410	

>>>'IALOG' not recognized as set or accession number
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28sep00 07:56:52 User208760 Session D1675.1
\$0.41 0.116 DialUnits File1
\$0.41 Estimated cost File1
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\$0.46 Estimated cost this search
\$0.46 Estimated total session cost 0.116 DialUnits

File 410:Chronolog(R) 1981-2000 Jul/Aug
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\$0.00 0.056 DialUnits File410
\$0.00 Estimated cost File410
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\$0.04 Estimated cost this search
\$0.50 Estimated total session cost 0.172 DialU s

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? s (gp39 or cd40L or cd40(w)ligand) and antibod?

496 GP39
2999 CD40L
10149 CD40
262485 LIGAND
4039 CD40(W)LIGAND
1594111 ANTIBOD?

S1 1987 (GP39 OR CD40L OR CD40(W)LIGAND) AND ANTIBOD?
? s s1 and py=1990

1987 S1
1848750 PY=1990
S2 0 S1 AND PY=1990
? s s1 and py=1991

1987 S1
1831656 PY=1991
S3 1 S1 AND PY=1991
? t s3/7/all

3/7/1 (Item 1 from file: 399)
DIALOG(R)File 399:CA SEARCH(R)
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114227369 CA: 114(23)227369y PATENT
Immunogenic glycoproteins of human cytomegalovirus gCII complex,
monoclonal antibodies to the glycoproteins, and use of the glycoproteins
for a vaccine
INVENTOR(AUTHOR): Gehrz, Richard C.; Kari, Bruce E.
LOCATION: USA
ASSIGNEE: Children's Biomedical Research Center
PATENT: PCT International ; WO 9102004 A1 DATE: 910221
APPLICATION: WO 90US4371 (900803) *US 390300 (890807)
PAGES: 48 pp. CODEN: PIXXD2 LANGUAGE: English CLASS: C07K-015/14A;
A61K-039/00B DESIGNATED COUNTRIES: CA; JP DESIGNATED REGIONAL: AT; BE; CH
; DE; DK; ES; FR; GB; IT; LU; NL; SE
SECTION:
CA215002 Immunochemistry
IDENTIFIERS: gCII glycoprotein complex human cytomegalovirus, virus
cytomegalo human glycoprotein gCII, monoclonal antibody gCII glycoprotein
cytomegalovirus, vaccine cytomegalovirus gCII glycoprotein
DESCRIPTORS:
Developmental stages, infant...

gCII glycoprotein complex glycoprotein reactive with human
cytomegalovirus seropos. adult serum but not with seropos. serum of
congenitally infected

Senescence...
gCII glycoprotein complex glycoprotein reactive with human
cytomegalovirus seropos., serum of, but not with congenitally infected
seropos. infant sera

Virus, animal, cytomegalo-...
gCII glycoprotein complex of, of human, glycoproteins of and monoclonal
antibodies to glycoproteins of

Glycoproteins, specific or class, gCII...
glycoproteins of and monoclonal antibodies to glycoproteins of, of
human cytomegalovirus

Vaccines...
glycoproteins of gCII glycoprotein complex of human cytomegalovirus for

Glycoproteins, specific or class...
gp39-48, of human cytomegalovirus, monoclonal antibody reactivity with

Glycoproteins, specific or class...
gp45-63, of human cytomegalovirus gCII glycoproteins, monoclonal
antibody reactivity with

Glycoproteins, specific or class, gCI...
human cytomegalovirus, seropos. adult and infant sera reactive with,
gCII glycoproteins in relation to

Cell membrane... Cell nucleus... Cytoplasm...
monoclonal antibody to human cytomegalovirus gCII glycoproteins
reactivity with

Glycoproteins, specific or class, gp93...
of gCI glycoproteins of human cytomegalovirus, gCII glycoproteins in
relation to

Glycoproteins, specific or class, gp200... Glycoproteins, specific or class,
50,000-52,000-mol.-wt... Glycoproteins, specific or class, 90,000-mol.-wt.
...
of gCII glycoprotein complex of human cytomegalovirus

Glycoproteins, specific or class, 52,000-mol.-wt....
of human cytomegalovirus gCI glycoproteins, seropos. adult and infant
sera reactive with gCII glycoproteins in relation to

Glycoproteins, specific or class, 130,000-mol.-wt....
of human cytomegalovirus, monoclonal antibody reactivity with

Lymphocyte, T-, helper...
response of, to human cytomegalovirus, vaccine of glycoproteins of gCII
glycoprotein complex of human cytomegalovirus for

Antibodies, monoclonal...
to glycoproteins of gCII glycoprotein complex of human cytomegalovirus

Glycoproteins, specific or class...
158,000-mol.-wt., of human cytomegalovirus gCI glycoproteins

Glycoproteins, specific or class...
47,000-52,000-mol.-wt., of human cytomegalovirus, monoclonal antibody
reactivity with

Glycoproteins, specific or class...
47,000-63,000-mol.-wt., of human cytomegalovirus, monoclonal antibody
reactivity with

? s s1 and py=1992

1987 S1
1863161 PY=1992
S4 7 S1 AND PY=1992
? rd s4

...completed examining records
S5 3 RD S4 (unique items)
? t s5/7/all

5/7/1 (Item 1 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)
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08750154 BIOSIS NO. 99395039505

The human T cell antigen **gp39**, a member of the TNF gene family, is a ligand for the CD40 receptor: Expression of a soluble form of **gp39** with B cell co-stimulatory activity.

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ABSTRACT: Signals delivered to B cells via CD40 can synergize with those provided by other B cell surface receptors to induce B cell proliferation and **antibody** class switching as well as modulate cytokine production and cell adhesion. Recently, it has been shown that the ligand for CD40 is a cell surface protein of approx 39 kDa expressed by activated T cells, **gp39**. Here we report on the isolation and characterization of a cDNA clone encoding human **gp39**, a type II membrane protein with homology to TNF, and the construction and characterization of a soluble recombinant form of **gp39**. COS cell transfectants expressing **gp39** synergized with either anti-CD20 mAb or PMA to drive strong B cell proliferation and alone were able to drive B cells to proliferate weakly. In all cases the B cell proliferation induced by **gp39**-expressing COS cells was reduced to background levels by the addition of soluble CD40. Unlike **gp39**-expressing COS cells, recombinant soluble **gp39** was not mitogenic alone and required co-stimulation to drive B cell proliferation. These results suggest that B cells require a second signal besides **gp39**-CD40 to drive proliferation and that soluble **gp39** alone in a non-membrane bound form is able to provide co-stimulatory signals to B cells.

5/7/2 (Item 2 from file: 5)

DIALOG(R)File 5:BIOSIS Previews(R)

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IDENTIFICATION OF A SOURCE OF BIOLOGICALLY ACTIVE **CD40 LIGAND**

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ABSTRACT: We have identified the murine thymoma line EL4 as a source of biologically active **CD40 ligand**. Using a biotin-labeled soluble CD40.Fc fusion protein, consisting of the extracellular domain of human CD40 and the Fc region of human IgG1, EL4 cells were subjected to repeated flow cytometric cell sorting to select for cells with enhanced biotinylated CD40.Fc binding. After nine rounds of sorting, the number of CD40.Fc binding sites/cell had risen from 450 on the unsorted parental EL4 cells to 15000 on EL40.9 cells (EL4 cells sorted with biotinylated CD40.Fc for nine rounds). Scatchard analysis of radiolabeled CD40.Fc binding revealed that the surface-expressed **CD40 ligand** on parental EL4 and EL40.9 cells bound its receptor with a single class of

high-affinity sites ($K_d = 0.5$ nM). Supernatant (SN) from the sorted EL40.9 cells was found to contain human and murine B cell stimulatory activity which could be removed by preclearing with immobilized CD40.Fc, confirming the presence of soluble **CD40 ligand** in the preparations. EL40.9 supernatant enhanced soluble CD23 (sCD23) release and induced IgE secretion from interleukin 4-stimulated human B cells. In addition, EL40.9 SN contained proliferative activity for anti-IgM-activated murine B cells which could be removed by treatment with immobilized CD40.Fc. However, the same SN had no demonstrable activity on the proliferation of human B cells. The results presented here describe, for the first time, a source of membrane-bound and soluble **CD40 ligand**. The soluble form of this murine ligand has activity on murine and human B cells and induces some of the functional responses predicted for the ligand based on the action of stimulatory **antibodies** directed against the human CD40 surface molecule.

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Molecular and biological characterization of a murine ligand for CD40.
Armitage RJ; Fanslow WC; Strockbine L; Sato TA; Clifford KN; Macduff BM;
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The CD40 surface molecule is a 277-amino-acid glycoprotein expressed on B lymphocytes, epithelial cells and some carcinoma cell lines. Monoclonal **antibodies** against CD40 mediate a variety of effects on B lymphocytes, including induction of intercellular adhesion, short- and long-term proliferation, differentiation and enhanced tyrosine phosphorylation of proteins. In addition, germinal centre centrocytes are prevented from undergoing apoptosis by activation through CD40 and receptor for antigen. These data indicate that CD40 could be a receptor for an unknown ligand with important functions in B-cell development and activation. This hypothesis is strengthened by the homology of the extracellular region of the CD40 molecule with a family of cell-surface glycoproteins that includes the receptors for nerve growth factor and tumour necrosis factor. Here we report the cloning of a ligand for CD40 that is expressed on the cell surface of activated T cells and mediates B-cell proliferation in the absence of co-stimulus, as well as IgE production in the presence of interleukin-4.

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